THE COGNITIVE OVERRIDE OF ANXIETY IS ACCOMPLISHED BY SOCIAL FAMILIARITY AND IS MEDIATED BY THE MEDIAL PREFRONTAL CORTEX.

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Abstract

In rats, social familiarity can alleviate anxiety-like behavior observed in the social interaction test. We propose that a neural circuit that includes the medial Prefrontal Cortex (mPFC) and Basolateral Amygdala (BLA), in which the mPFC processes social cues of familiarity and suppresses BLA outputs that lead to anxiety-like behavior, regulate this social familiarity effect. To investigate the effect of social familiarity on anxiety, we developed the Social Interaction-Habituation (SI-h) paradigm, consisting of a 5 min social interaction test repeated daily with the experimental rat exposed to the same partner rat on each test day. As the experimental rat becomes "familiar" with the partner rat, a significant increase in SI time is observed by day 5 compared to day 1, producing a SI-familiarity effect (SI-f). This SI-f effect is dependent on the presence of an anxiogenic stimulus (bright light), and familiarity to a partner rat. No increases in SI times were observed in rats when the SI-h test was performed under dark conditions or when exposed to novel partners on days 1-5. After establishing SI-f, exposure to a novel partner significantly reduces SI times, suggesting the SI-f effect is a result of recognition of the familiar partner rat. Re-exposure to the original partner in a new environment produces an enhanced SI-f effect; SI time significantly increases from day 1 by day 3. Bilateral inhibition of the mPFC with a $GABA_A$ agonist blocks the anxiolytic SI-f effect. Exposure to the same partner 24 hours following mPFC inhibition, SI times increase significantly higher than day 1. These data indicate that the mPFC activity is necessary for expression of the SI-f effect.